



Pan/Tilt Network Camera --- PT3112/3122

User's Manual



Before You Use

Surveillance devices may be prohibited by law in your country. Though Network Camera is not only a high performance web equipped camera but also a flexible surveillance system, ensure that the operation of such devices are legal before installing this unit for surveillance.

It is important to carefully check the contents with the "Package Contents" chapter after opening the package. Fully read and follow the "Installation" chapter to prevent damage caused by abnormal usage and reduce most problems during usage.

Basically Network Camera is a network device and should be easy to use for those who already have basic network knowledge. If there is a system error and it does not recover easily due to erroneous configuration, refer to the appendix "Troubleshooting" for appropriate operation.

Network Camera has been designed to build various applications for video sharing, general security or demonstration purposes. Understanding the meaning of each parameter in "How to Use" chapter can best utilize Network Camera and ensure correct operations. To those creative and professional developers, chapter of "URL Commands of Network Camera" will be a very helpful reference to customize existing homepages or integrating with current web server.


Those paragraphs preceded by  should be fully understood and cautioned. Ignoring the warnings may result in serious hazards.

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Package Contents

PT3112 or PT3122



Camera stand



Power adapter



Software CD



A/V Cable



Quick installation guide



Remote Controller

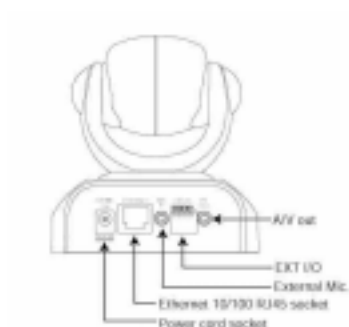


Warranty card



Installation

Hardware installation



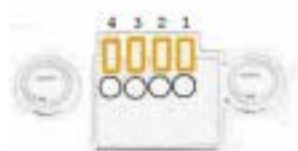
All necessary accessories can be found in the product package except for the Ethernet cable that depends on the user's environment. The Ethernet cable should meet UTP category 5 that cannot exceed 100 meters.

⚠ Connect the jack of the power adapter to Network Camera prior to plugging the utility end into the utility power socket. It will reduce accidental electric surge shock.

As soon as the power adapter is plugged into the utility socket, the front LED will switch between green and red for several times. After passing the self-test, the LED will shut off and Network Camera will standby for software installation. Otherwise refer to Appendix A for troubleshooting.

Network Camera provides a general I/O terminal block with one digital input and one relay switch for device control. Pin 1 and pin 2 can be connected to an external sensor and the state of voltage will be monitored from the initial state 'LOW'. The relay switch of pin 3 and pin 4 can be used to turn on or off the external device.

⚠ Consult with the dealer of the peripherals for correct installation.1



1	DI+	INPUT (Max. 50mA, 12VDC)
2	DI-	INPUT (Initial state of DI is low)
3	SW_COMMON	OUTPUT (open from SW_OPEN at initial state) (close with SW_OPEN when set DO to ON)
4	SW_NOPEN	OUTPUT (Max. 1A, 24VDC or 0.5A, 125VAC)

Software installation

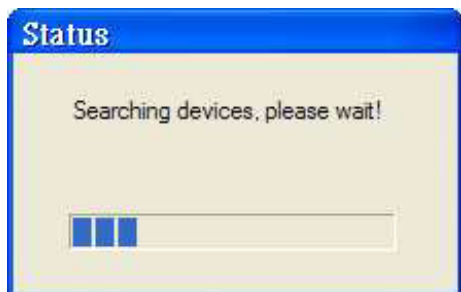
In the following content, "user" refers to those who can access Network Camera and "administrator" refers to the supervisor who can configure Network Camera and grant users access.

When completing the hardware installation, administrators needs to put the product software CD into the CDROM drive of a PC running with MS Windows. An auto-run program will popup (If the program is not auto-run, please click on the autorun.exe at the root directory of the software CD to invoke the program).



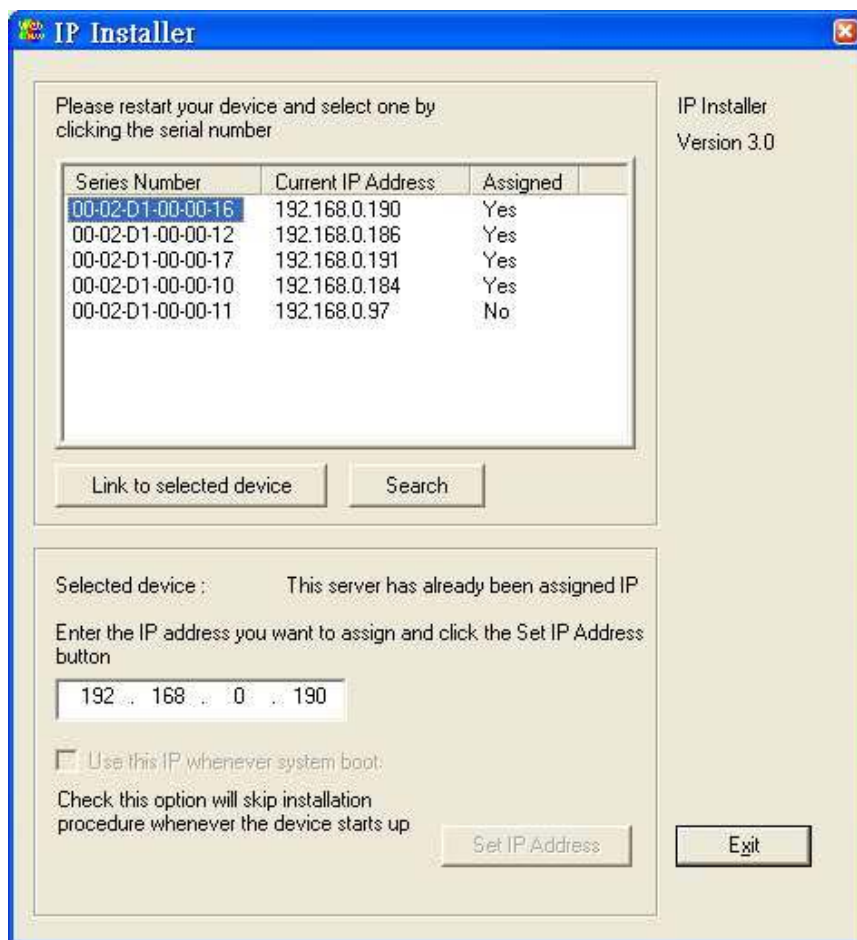
Click on the IP installer to invoke Vivotek's installation program.

When the IP installer starts up, a searching box will popup, that is the program is searching Vivotek's product on the same LAN:



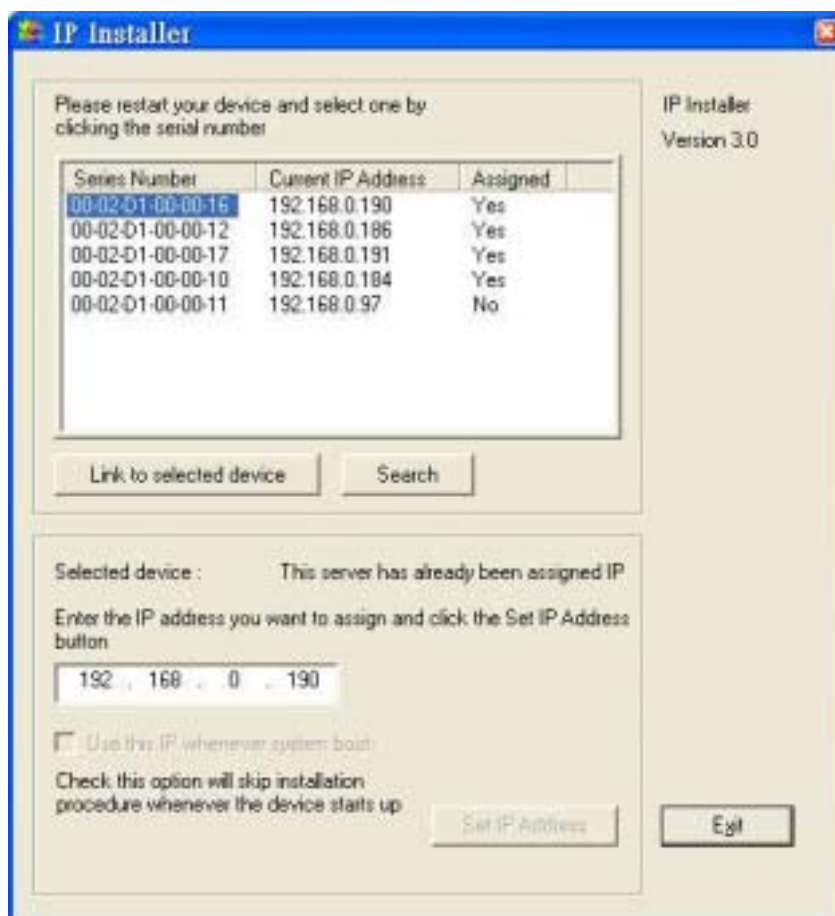
After searching the LAN, the main window of IP installer will pop up.

The IP address shown in "Current IP Address" field depends on the local network. It may get from the DHCP server. If there is no DHCP server, the camera will try to find a free IP address for itself (this would take longer time, from 15 second to 3 minute, depends on your LAN status). After the IP address is assigned to the camera, The "Activity" status LED will blink.



Vivotek's new uPnP function of the camera will always assign an IP address for the itself. Therefore, the administrator can click the "Link to selected device" to invoke I.E. to connect the camera. If the camera is not in the list of IP installer, click "Search" button to search camera on the LAN.

For the series number field, please check the label attached on the bottom of the camera.



First access to Network Camera

Check network settings even if connected already

Although Network Camera already can be connected after software installation from Local Area Network, administrators should complete the network settings in the configuration page including the correct subnet mask and IP address of gateway and DNS. Ask for the network administrator or Internet service provider for the detail information. By default Network Camera will need administrator's installation every time it reboots. If the network settings are sure to work all the time, disable the install option. Refer to "Network settings" in system configuration page for details. Once any setting is entered incorrectly and thus hangs Network Camera, restore the factory settings according to the steps in troubleshooting.

Add password to protect from offense from strangers

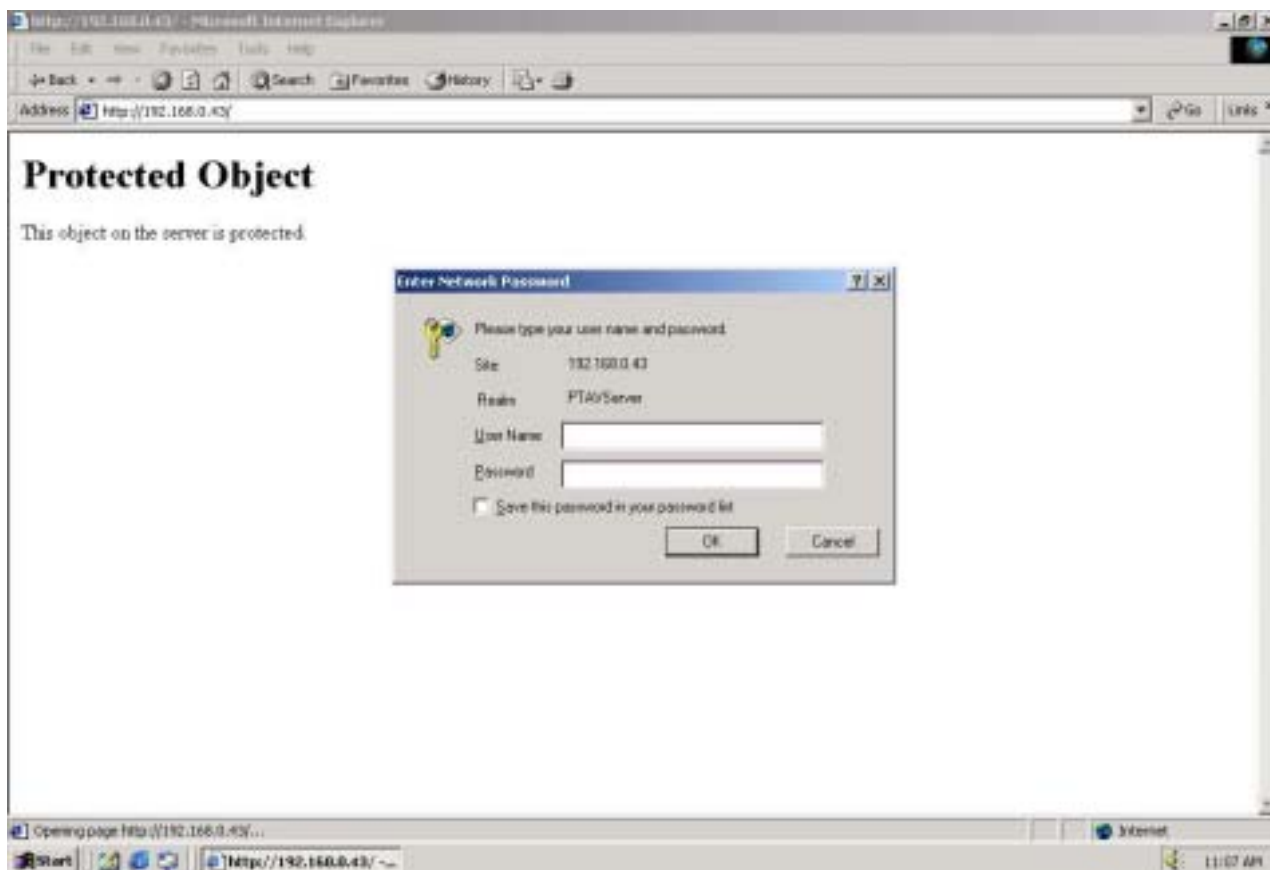
Since the administrator's password is blank by default, Network Camera will not ask for any password. However the administrator should change the password as soon as possible to protect from network intruders. Once the administrator's password is saved, Network Camera always needs user name and password before access. The administrator can setup at most twenty user accounts. Each user is able to access Network Camera except for system configuration. Some critical functions are limited only for administrators such as system configuration, user administration and software upgrade. The user name of the administrator is assigned to "root" permanently. Once the password is changed, the browser will display an authentication window to ask for the new password. **There is no way to discover administrator's password. If the password is forgotten, only restoring factory defaults can help.**

How to Use


Authentication

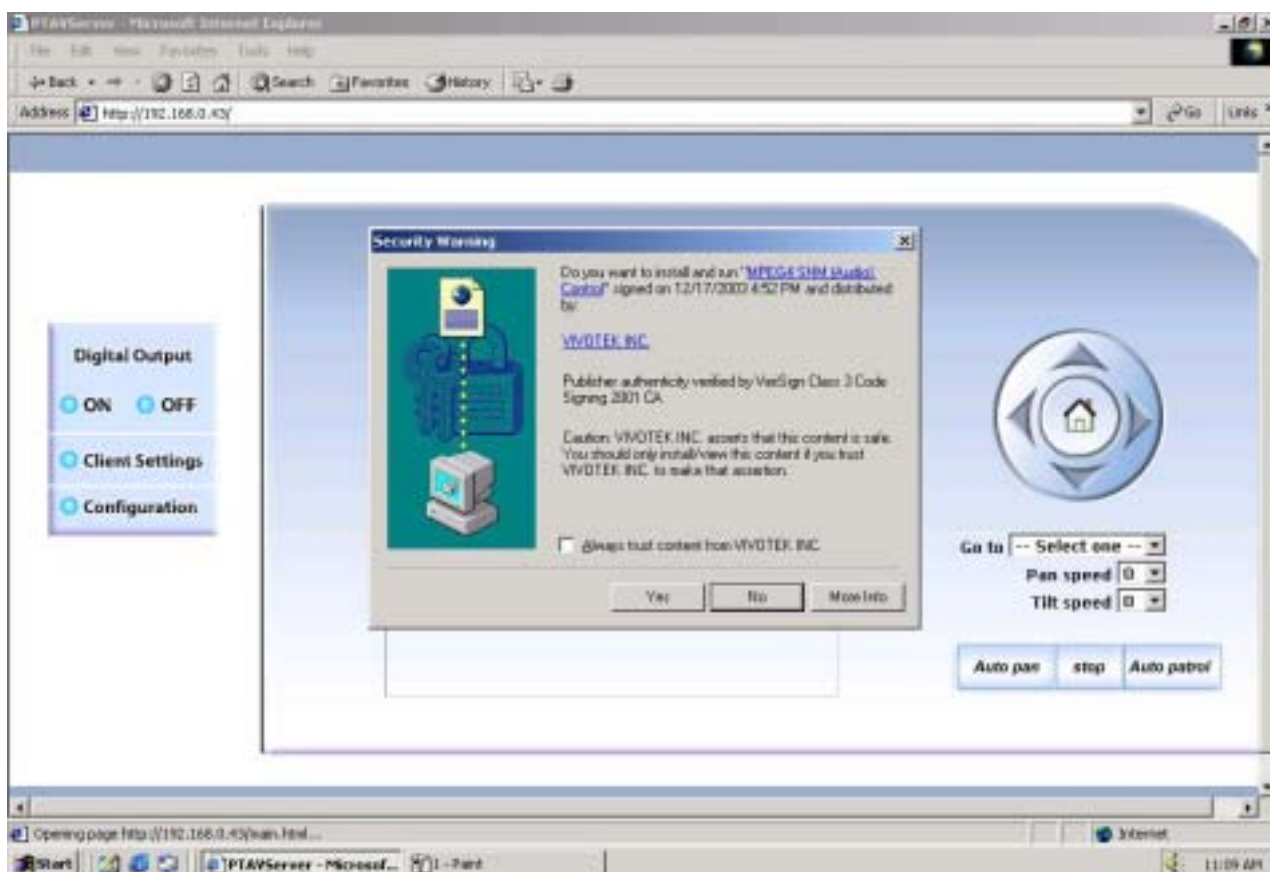
After opening the Web browser and typing in the URL of Network Camera, a dialogue window may pop up to request a username and password except that the administrator does not save any password. Upon successful authentication, the main page will display like the figure below.

In the figure, the foreground is the login window and the background shows the message when authentication fails. The user may check the option to save the password for future convenience.



Installing plug-in

If it is initial access to Network Camera in Windows, the web browser may prompt for permission to install a new plug-in that is provided by Network Camera. Prompt or not and the prompt message depend on the Internet security settings of user's PC or notebook. The highest security level may prohibit any installation and execution attempt even the plug-in is safe. This plug-in has been registered for certificate and is used to display the motioned pictures in the browser. Users may click on  to proceed. If the web browser does not allow the user to install, check the Internet security option to lower security levels or contact network supervisors.



Primary user's capability

Main screen with camera view

There are three parts in the layout of the main page:

- A. Configuration functions: The camera can be configured through these user interfaces.
- B. Video of the camera: the camera video window.
- C. Pan/Tilt control buttons: the buttons provide a command interface to control the camera.

Click on the configuration link to the right of the image window to enter the configuration page.



"Digital Output" Click on the "On" or "Off" button can turn the Digital output to on or off status.

"Client Settings" Click on the button would link to client setting pages, please check the following session for more details.

"Configuration" Only administrator can access camera configurations.

Direction buttons The buttons contain: Left, Right, Up, Down and Home function. The home button would command camera to the center of the camera.

"Go to" Once the administrator set the preset positions, users can move the camera to the positions through this control.

"Pan speed" This button can set the moving range of "Left" and "Right" commands.


"Tilt speed" This button can set the moving range of "Up" and "Down" commands.

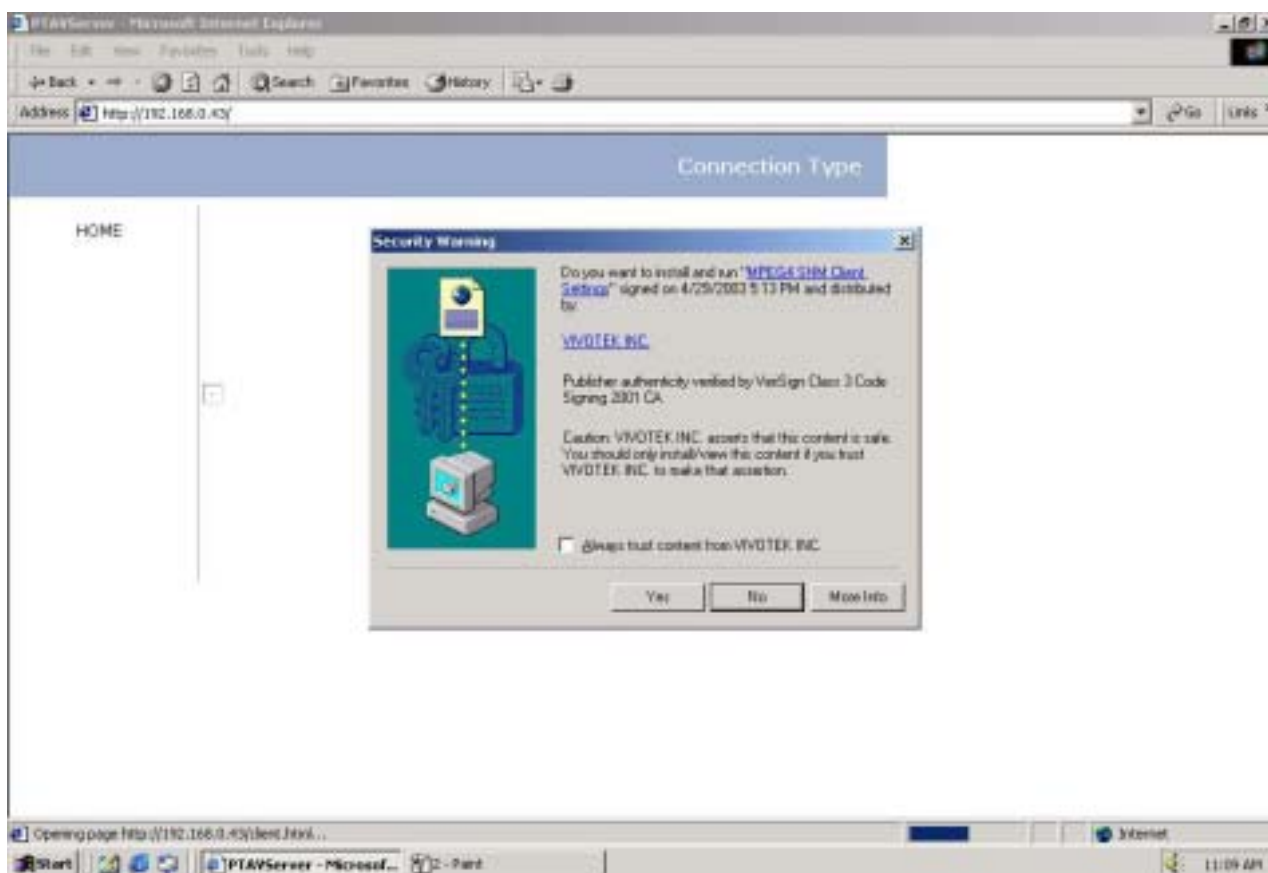
"Auto Pan" This button would command the camera to pan from the current position to the most left or most right, than to the opposite position. After reaching both vertical end position, the camera would stop at the same position as the one before pan.

"Stop" The button stops the "Auto Pan" command or "Auto Patrol" command.

"Auto Patrol" This button would command the camera to patrol between the preset positions in the patrol list that can be set on the **"Camera control page"**. After one patrol cycle, the camera would stop at the same position as the one before the patrol.

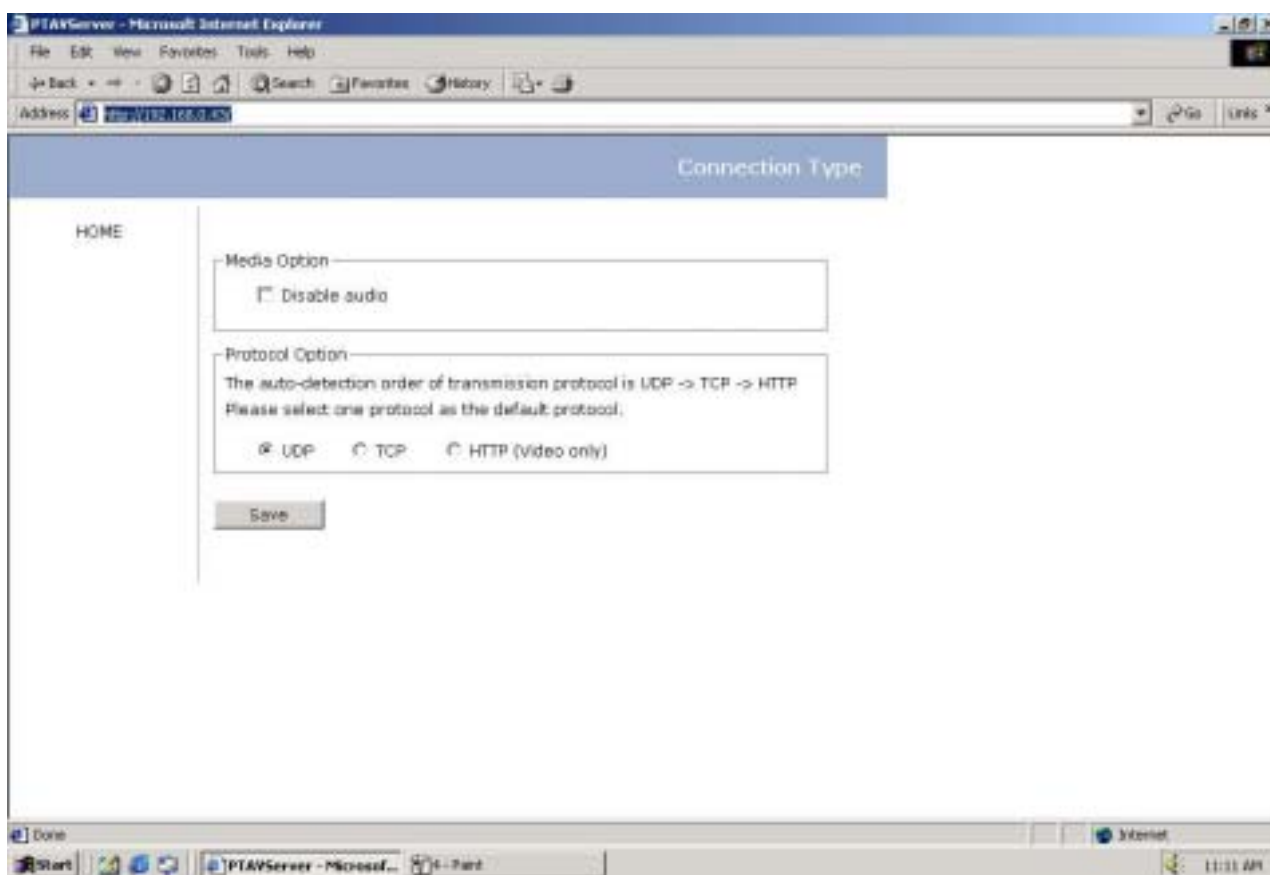
Client Settings

If it is the first access to “**Connection type**” page in Windows, the web browser will ask to install a new plug-in that is provided by Network Camera. This plug-in has been registered for certificate and is used to change the parameters at the client side. Users may click on  to install the plug-in. If the web browser does not allow the user to install, check the Internet security to lower the security level or contact network supervisors.



There are two settings for the client side. One is “**Media Option**” for users to determine if the audio should be muted. The other is “**Protocol Option**” to choose the connection protocol between client and server. There are three protocols to optimize your usage - **UDP**, **TCP** and **HTTP**. With UDP protocol, audio and video streams can be

more real-time. But some packets may be lost due to network burst traffic and images will be obscure. If TCP protocol is selected, packet loss would not occur and video display will more accurate. But the real-time effect is worse than UDP protocol. If the network is protected by a firewall and it opens HTTP port (80) only, HTTP protocol must be selected. In this mode, audio will not be sent and you can see the video only. If you have no special needs and no idea to choose one among them, simply choose UDP. Generally the client will automatically try these protocols by the following order, UDP → TCP → HTTP. After the client connects to the Network Camera successfully, “**Protocol Option**” will show the working protocol. The chosen protocol will be recorded in the user's PC and used for next connection. If the network environment is changed or users want to let web browser detect again, select UDP manually to save and then return HOME to connect again.



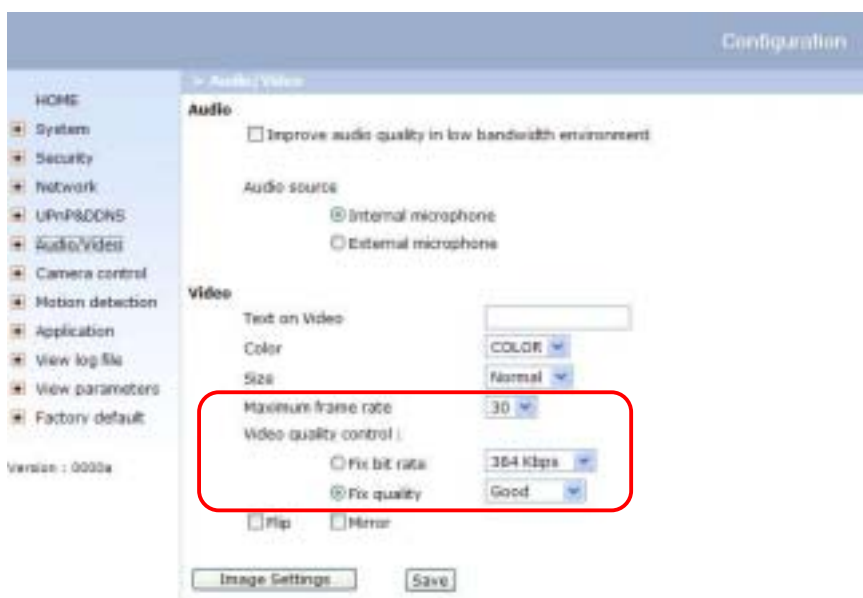
<url> <http://<Network Camera>/protocol.html>

<Network Camera> is the domain name or original IP address of Network Camera.

Administrator's capability

Tune the best performance

The best performance means the image refresh rate should be the fastest as possible and the video quality should be the best as possible at the lowest network bandwidth as possible. Three factors, **“Maximum frame rate”**, **“Fix bit rate”**, and **“Fix quality”** in the Video configuration page, are correlative to the performance.



My priority is real-time motioned images

To achieve the real-time visual effect, the network bandwidth should be large enough to transmit 20 image frames or more. If you are in the broadband network over 1 Mbps, you can fix the bit rate to 1000Kbps or 1200Kbps, or fix the quality to achieve the maximum frames. The maximum frame rate is 25 in 50Hz system and 30 in 60Hz system. If your network bandwidth is more than 384Kbps, you can fix the bit rate according to your bandwidth and set the maximum frame rate to 25 or 30. If the images vary dramatically in your environment, you may slow down the maximum

frame rate to 20 to decrease the transmitted data for better video quality since human could not easily tell the difference between 20 and 25 or 30 frames per second. If your network bandwidth is below 384 Kbps, you should fix the bit rate according to your bandwidth and try out the best performance by tuning the maximum frame rate. The larger frame rate in slow network will blur the images. You may also try to choose "Half" in size option for better images or "Halfx2" for larger image size. Note that even you have well tuned the parameters, the performance may still vary from person to person when multiple users view at the same time. Because the network has burst constraint and everyone's environment is not the same, any poor connection will drop the normal performance.

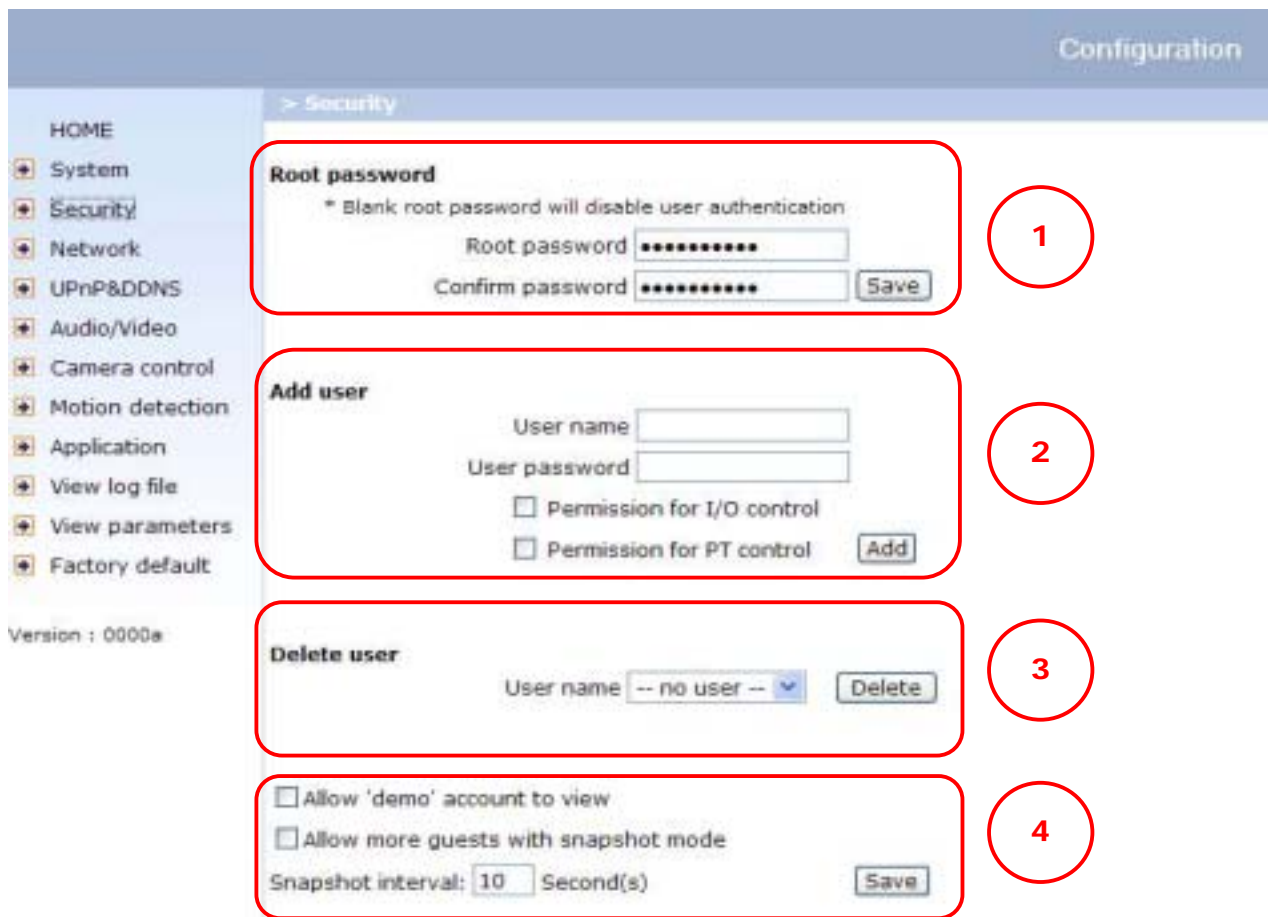
My priority is clear identification for each image

To have the best video quality, you should fix the quality to detailed or excellent and tune the maximum frame rate to suit for your network bandwidth. If you get some broken pictures in slow network, you can choose TCP protocol in "Connection type" for more accurate transmission but the received images may have certain time delay. Note that any slow connection in multiple users will drop the proper performance.

I want to compromise between real-time and clear images

If you have a broadband network, choose fix quality to normal or better rather than fix bandwidth. Otherwise fix the bandwidth according to your actual network speed and set the frame rate to 30. If the images look bad, select the lower frame rate above 15. If the images are not improved, select the lower bandwidth.

Open accounts for users



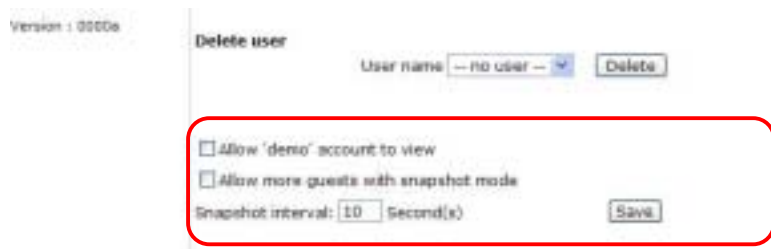
Build a multimedia web attraction site

Show off to my friends – mid-scale service

Network Camera can allow ten visitors on-line simultaneously. Just follow the installation, focus Network Camera on any view you would like friends to share and tell them the address to type in the web browser. Of course you have to maintain your friend list in the security configuration page to filter unexpected strangers. No need to have the geeks' skill and equipments, no need to find suitable software.

Show my products or scenic spot for e-business – large-scale service

If the visitors may exceed the account limit, Network Camera can supply extra viewers the homepage of snapshot mode that will have the JPEG still image refreshed periodically and automatically. It needs script function supported by the web browser.



Version: 1.0000a

Delete user

User name: -- no user -- [Delete]

☐ Allow 'demo' account to view

☐ Allow more guests with snapshot mode

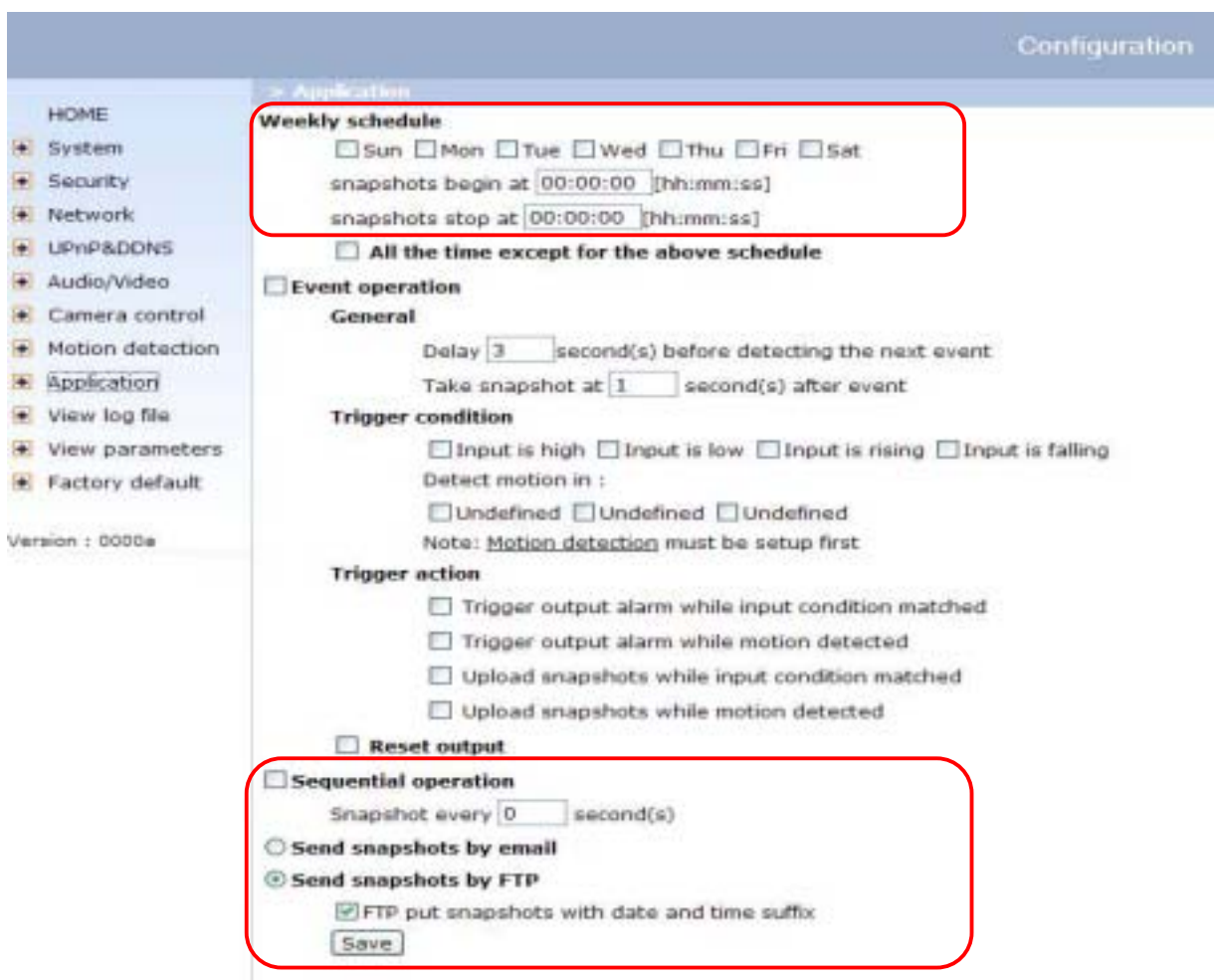
Snapshot interval: 10 Second(s) [Save]

1. Click on "Configuration" on homepage,
2. Click on "Security" at the left column,
3. Go to the page bottom and check "Allow more viewers with snapshot mode",
4. Set the snapshot interval to refresh the still image automatically. The longer the snapshot interval is, the better the snapshot mode works for more viewers.

If you want to expand the viewers tremendously, host a powerful web site that can handles large network traffic and attract eyeballs with the picture refreshed often by Network Camera.

If the web space has FTP service,
Setup Network Camera as an FTP client to upload the pictures. The advantage is the access of Network Camera is independent of the viewers to ensure the quality.

1. Click on "Configuration" on homepage,
2. Click on "Network" at the left column,
3. Fill the FTP related settings including server, user name and password, as well as the upload path if specified by the web space,
4. Click on save and wait for system restart,



Configuration

HOME

- System
- Security
- Network
- UPnP&DDNS
- Audio/Video
- Camera control
- Motion detection
- Application
- View log file
- View parameters
- Factory default

Version : 0000a

> Application

Weekly schedule:

☐ Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat

snapshots begin at 00:00:00 [hh:mm:ss]

snapshots stop at 00:00:00 [hh:mm:ss]

☐ All the time except for the above schedule

☐ Event operation

General

Delay 3 second(s) before detecting the next event

Take snapshot at 1 second(s) after event

Trigger condition

☐ Input is high ☐ Input is low ☐ Input is rising ☐ Input is falling

Detect motion in :

☐ Undefined ☐ Undefined ☐ Undefined

Note: Motion detection must be setup first

Trigger action

☐ Trigger output alarm while input condition matched

☐ Trigger output alarm while motion detected

☐ Upload snapshots while input condition matched

☐ Upload snapshots while motion detected

☐ Reset output

☐ Sequential operation

Snapshot every 0 second(s)

☐ Send snapshots by email

☒ Send snapshots by FTP

☒ FTP put snapshots with date and time suffix

Save

5. Click on "Application" at the left column,
6. Select the weekday and daily schedule you want to upload the pictures,
7. Select "Sequential operation" and set the interval,
8. Select FTP without date time suffix as the upload method and click on save,
9. The image file uploaded to the web space is named "video.jpg". Check if the file is successfully uploaded to the correct folder,
10. Prepare a homepage with the embedded image reference to the image file uploaded via FTP in advance.

If the web space has no FTP service,

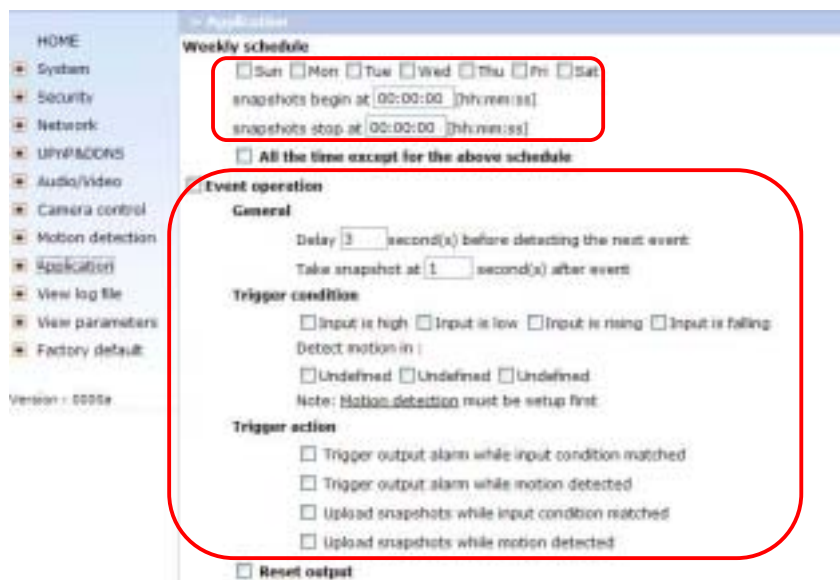
An auto-refresh homepage can be used to periodically poll the newest image from Network Camera. It is mostly useful in the free web space provider as their FTP service may be limited to use.

1. Prepare an auto-refresh homepage like the following example. The URL of image is `http://"IP address of Network Camera"/cgi-bin/video.jpg`. Modify the IP address according to your Network Camera. Also define the refresh interval according to your network bandwidth for best effect. Too frequent refresh rate for a great deal of visitors may overload Network Camera and retard the response.

Build a security application

Administrators can combine options on the application page to perform many useful security applications. There are two trigger sources coming from attached devices and/or motion detection.

There are also two kinds of actions responding to events including uploading snapshots over internet and driving attached devices. To upload the snapshots, users can choose wither email or FTP according to user's needs. Both e-mail and FTP use the network settings on the network page. Refer to the definition section for detail configuration.



HOME

- System
- Security
- Network
- UPnP/IGMP
- Audio/Video
- Camera control
- Motion detection
- Application
- View log file
- View parameters
- Factory default

Version : 0000a

Weekly schedule

☐ Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat

snapshots begin at 00:00:00 [hh:mm:ss]

snapshots stop at 00:00:00 [hh:mm:ss]

☐ All the time except for the above schedule

Event operation

General

Delay 3 second(s) before detecting the next event

Take snapshot at 1 second(s) after event

Trigger condition

☐ Input is high ☐ Input is low ☐ Input is rising ☐ Input is falling

Detect motion in :

☐ Undefined ☐ Undefined ☐ Undefined

Note: Motion detection must be setup first

Trigger action

☐ Trigger output alarm while input condition matched

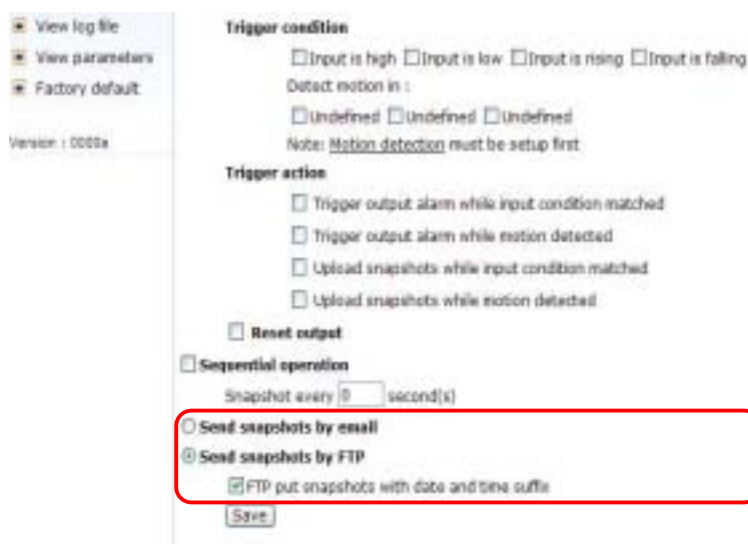
☐ Trigger output alarm while motion detected

☐ Upload snapshots while input condition matched

☐ Upload snapshots while motion detected

☐ Reset output

1. Click on "Configuration" on homepage,
2. Click on "Application" at the left column,
3. Check the weekdays as you need and give the period of "Snapshots begin" time and "Snapshots end" time to monitor the trigger conditions every day,
4. Check the "Event operation". The trigger



View log file

View parameters

Factory default

Version : 0000a

Trigger condition

☐ Input is high ☐ Input is low ☐ Input is rising ☐ Input is falling

Detect motion in :

☐ Undefined ☐ Undefined ☐ Undefined

Note: Motion detection must be setup first

Trigger action

☐ Trigger output alarm while input condition matched

☐ Trigger output alarm while motion detected

☐ Upload snapshots while input condition matched

☐ Upload snapshots while motion detected

☐ Reset output

☐ Sequential operation

Snapshot every 0 second(s)

☐ Send snapshots by email

☒ Send snapshots by FTP

☒ FTP put snapshots with date and time suffix

Save

condition can be set to detected motion or status of the attached device,

5. Set the delay **before detecting next event** to avoid continuous false alarms following the original event,

6. Set the delay to **take snapshots after event** to capture the direction of the moving objects,

Send snapshots when motion is detected

If no external sensor is available, administrators can utilize the built-in motion detection to monitor any abnormal movement and then send emails with snapshots included for security check.

7. Click on "**Motion detection**" at the left column,

8. Check "Enable motion detection",

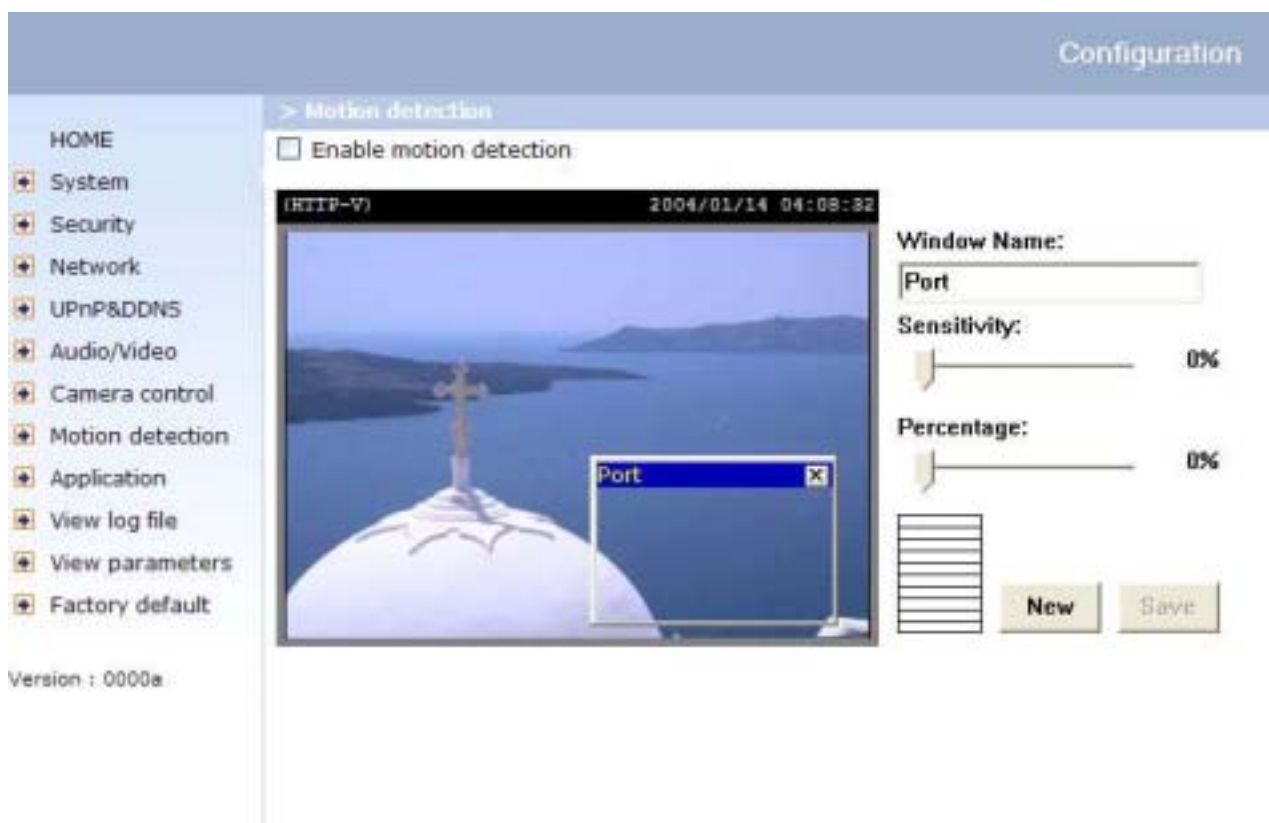
9. Click on new to have a new window to monitor video,

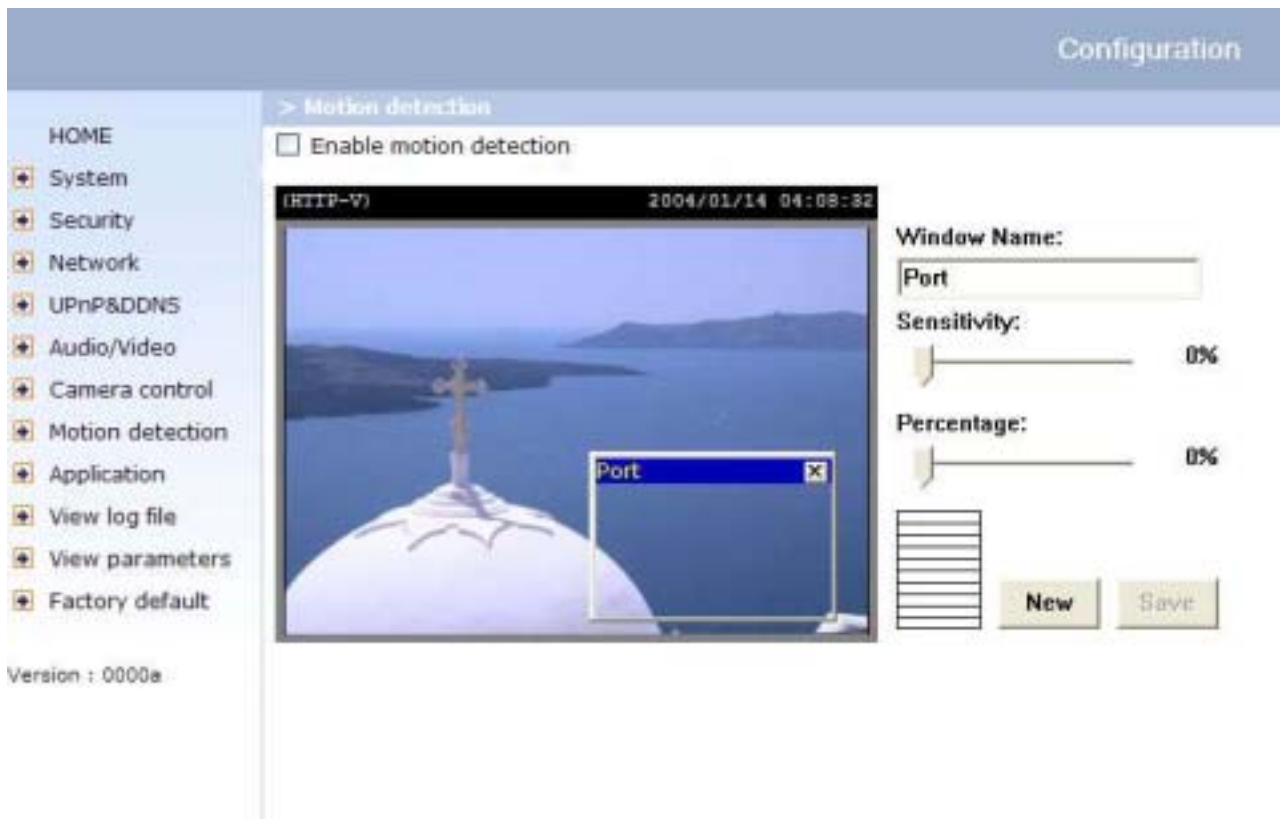
10. Type in a name to identify,

11. Use mouse to drag the window corner to resize or the title bar to move,

12. Tune the "**Sensitivity**" and "**Percentage**" according to the local environment. The higher sensitivity, the easier motion is detected. The higher percentage, the more difficult to detect small moving objects,

13. Click on save will enable the activity display. Green means the motion in the window is under the watermark set by administrators and red means it is over the watermark,





14. Click on "**Application**" at the left column,
15. Check the window name set in step 10,
16. Check "Upload snapshots while motion detected",
If emails with snapshots are preferred,
17. Check "Send snapshots by email",
18. Click on save to validate.

- If emails with snapshots are preferred,
17. Check "Send snapshots by email",
 18. Click on save to validate.

Software revision upgrade

Customers can obtain the up-to-date software from Vivotek web site. An easy-to-use Upgrade Wizard is provided to upgrade Network Camera with some clicks. This function is open to administrators only. To upgrade the system, follow the procedures below.

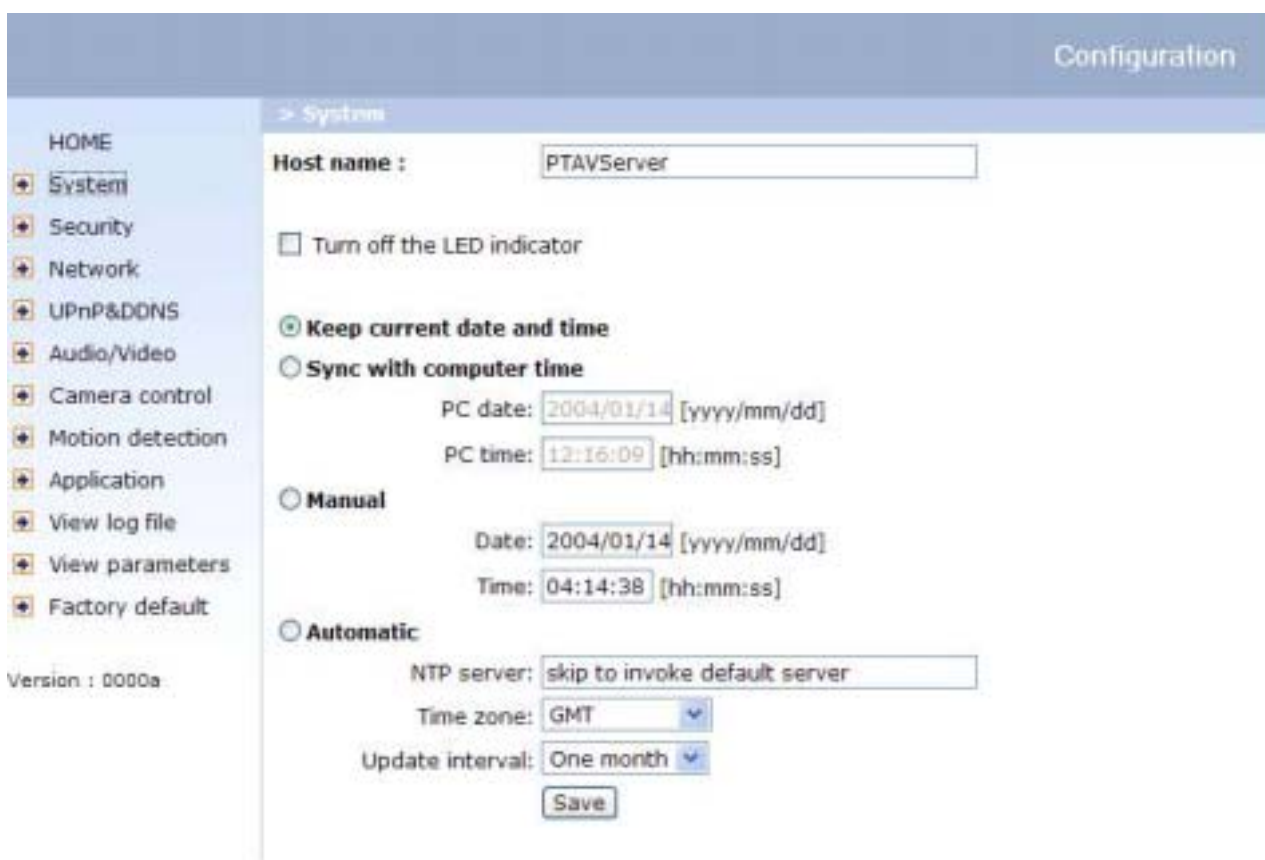
1. Download the firmware file named FLASH.BIN from the appropriate product folder.
2. Run the Upgrade Wizard and proceed by the prompts. Refer to the instructions of Upgrade Wizard for details.
3. The whole process will finish in couple minutes and automatically restart the system.



If the power fails during the writing process of Flash memory, the program in the memory of MiniAVServer may be destroyed permanently. If MiniAVServer cannot restart properly, ask the dealer for technical service.

Definition of Configuration

System configuration can be accessed only by administrators. Each category in the left column will be explained in the following pages. The bold texts are those specific phrase on the option pages. Administrators may type the URL below the figure to directly enter the frame page of configuration. If administrators also want to set certain options through the URL, read the reference appendix for details.



The screenshot shows the VIVOTEK Configuration interface. On the left is a sidebar with a menu: HOME, System (selected), Security, Network, UPnP&DNS, Audio/Video, Camera control, Motion detection, Application, View log file, View parameters, and Factory default. Below the menu is the text 'Version : 0000a'. The main content area is titled 'Configuration' and 'System'. It contains the following settings:

- Host name : PTAVServer
- ☐ Turn off the LED indicator
- ☒ Keep current date and time
- ☐ Sync with computer time
 - PC date: 2004/01/14 [yyyy/mm/dd]
 - PC time: 12:16:09 [hh:mm:ss]
- ☐ Manual
 - Date: 2004/01/14 [yyyy/mm/dd]
 - Time: 04:14:38 [hh:mm:ss]
- ☐ Automatic
 - NTP server: skip to invoke default server
 - Time zone: GMT (dropdown)
 - Update interval: One month (dropdown)
 - Save button

<url> <http://<Network Camera>/setup/config.html>

<Network Camera> is the domain name or original IP address of Network Camera.

System parameters

"Host name", the text will display as title at the top of the main page.

"Turn off the LED indicator", check this option to shut off the LED beside the lens. It can prevent others from observing the operation.

"Keep current date and time", click to reserve the current date and time of Network Camera. An internal real-time clock maintains the date and time even when the power of the system is turned off.

"Sync with computer time", synchronize the date and time of Network Camera with the local computer. The read-only date and time of PC is displayed as updated.

"Manual", adjust the date and time according to what entered by administrators. Notice the format in the related field while typing.


"Automatic", synchronize with the NTP server over the Internet whenever Network Camera starts up. It will fail if the assigned timeserver cannot be reached.


"NTP server", assign the IP address or domain name of the timeserver. Leaving the text box blank will let Network Camera connect to default timeservers.


"Time zone", is used to adjust the hour get from timeservers for local settings.

Remember to click on **Save** to validate changes. The later click on **Save**, the less accurate time set by manual.

User group administration

"Root password", to change the administrator's password, type the new password in both text boxes identically. What is typed will be displayed as asterisks for the security purpose. After pressing , the web browser will ask administrators for the new password for access.

"Add user", type the new user's name and password and press  to insert the new entry. The new user will display in the user name list for deletion. There are maximum twenty user accounts. Each user can have privilege to **"Permit to access DI/DO"**.


"Delete user", pull down the user list to find the user name and press .

"Allow 'demo' account to view", click to permit who typing "demo" as user name while authentication. No password is needed for demo account. Note that demo account is restricted to view only.

"Allow more viewers with snapshot mode" can let more viewers than limited account to watch the video. However the video is a still image automatically refreshed by the interval defined below. This feature must be supported by java script capability of web browsers.

"Snapshot interval" defines the refresh rate of the still image in the homepage seen by overloaded viewers.

Network settings

Any change made to this page will make the system restart to validate. Make sure every field is correctly typed before clicking on .

"Reset IP address at next boot", the default status is checked to eliminate incautious mistakes during installation. However it is very annoying to perform software installation whenever Network Camera starts. Once the network settings, especially the IP address, are correct, uncheck this option to use permanently. This option can also be disabled using the Installer program. Once the option is disabled, Network Camera will skip installation at the next boot and the Installer program will no longer find the installed units. That implies that Network Camera cannot be accessed if no one remembers the IP address, except by restoring factory default settings. However, with this option disabled Network Camera can automatically operate normally after restarting in case of losing power.

General

"IP address", it is necessary for network identification.

"Subnet mask", it is used to determine if the destination is in the same subnet. The default value is "255.255.255.0".

"Default router", it is the gateway used to forward frames to destinations in different subnet. Invalid router setting will fail in transmission to destinations in different subnet.

"Primary DNS", primary domain name server who translates names to IP addresses.

"Secondary DNS", secondary domain name server to backup the primary one.

SMTP

"SMTP(mail) server 1", the domain name or IP address of external email server.

"Recipient email address 1", the email address of recipients for snapshots or log file. Multiple recipients must be separated by semicolon, ';'.

"SMTP(mail) server 2", the domain name or IP address of another email server once the previous server is unreachable.

"Recipient email address 2", the email address of recipients for the backup server.

"Return email address", The return email address once the mails fail to send out.

FTP

"Local FTP server port", it can be other than default port 21. After changed, external FTP client program must change the server port of connection accordingly.

"1st FTP server", the domain name or IP address of external FTP server. The following user settings must be correctly configured for remote access.

"1st FTP user name", granted user name on the external FTP server.

"1st FTP password", granted password on the external FTP server.

"1st FTP remote folder", granted folder on the external FTP server. The string must conform to the external FTP server. Some FTP server cannot accept preceding slash symbol before the path if no virtual path mapping. Refer to the instructions of external FTP server for details. The folder privilege must be open for upload.

"Primary FTP passive mode", if Network Camera is located inside the network protected by firewall, data connection for FTP may be prohibited. Passive mode FTP can bypass the rule and succeed to upload snapshots. If the passive mode is selected, Network Camera can automatically attempt for active mode if the external FTP server does not support passive mode.

"2nd FTP server", the domain name or IP address of external FTP server.

"2nd FTP user name", granted user name on the backup FTP server.

"2nd FTP password", granted password on the backup FTP server.

"2nd FTP remote folder", granted folder on the backup FTP server.

"Secondary FTP passive mode", passive mode setting for the backup FTP server.

HTTP

"Http port", it can be other than default port 80. Once the port is changed, users must be informed for successful connection. For instance, when the administrator changes the HTTP port of Network Camera whose IP address is 192.168.0.100 from 80 to 8080,

users must type in the web browser "http://192.168.0.100:8080" instead of "http://192.168.0.100".


Streaming

"Control channel port", it can be other than default port 5001 to cooperate with the port opened by the firewall.

"Audio channel port", it can be other than default port 5002 to cooperate with the port opened by the firewall.

"Video channel port", it can be other than default port 5003 to cooperate with the port opened by the firewall.

"Improve audio quality in low bandwidth environment", if Network Camera works in versatile or low network bandwidth environment, users can check this option to improving audio quality by sacrificing some real-time synchronization.

 Some invalid settings may cause system failure to respond. Change the configuration only if necessary and consult with network supervisor or experienced users for correct settings. Once the system is lost contact, refer to Appendix A for reset and restore procedures.

Video codec parameters

"Text on video", the text will be displayed in the black bar above the video window with a timestamp. The timestamp is captured from date and time of Network Camera that is maintained by a built-in real-time clock.

"Color", select either one for color or monochrome video display.

"Size", there are three options for two video sizes. **"Half"** has quarter size of **"Normal"**. **"Half x 2"** has the same video size as **"Normal"** but has worse quality. However it consumes less network bandwidth.

"Power line frequency (for fluorescent light)", the fluorescent light will flash according to the power line frequency that depends on local utility. Change the frequency setting to eliminate uncomfortable flash image when the light source is only fluorescent light.





There are three dependent parameters provided for video performance adjustment.

"Maximum frame rate", it limits the maximal refresh frame rate that can be combined with the **"Video quality control"** to optimize the bandwidth utilization and video quality. If users want to fix the bandwidth utilization regardless of the video quality, choose **"Fix bit rate"** and select the desired bandwidth. The video quality may be poor in order to send maximal frames within the limited bandwidth when images change drastically. Consequently to ensure the video detail (quantization rate) regardless of the network, it will utilize more bandwidth to send the maximal frames when images change drastically.

"Flip", vertically rotate the video.

"Mirror", horizontally rotate the video. Check both if Network Camera is installed upside down.

"White balance", choose the suitable option for best color temperature.

 , click this button to pop up another window to tune **"Brightness"**, **"Contrast"**, **"Hue"** and **"Saturation"** for video compensation. Each field has eleven levels ranged from -5 to +5. The user may press  to fine-tune the image. When the image is O.K., press  to memorize the image settings.  can be clicked to recall the original settings without changes.

Configuration

HOME

- System
- Security
- Network
- UPnP&DDNS
- Audio/Video
- Camera control
- Motion detection
- Application
- View log file
- View parameters
- Factory default

Version : 0000a

> Audio/Video

Audio

- ☐ Improve audio quality in low bandwidth environment
- Audio source
 - ☒ Internal microphone
 - ☐ External microphone

Video

- Text on Video
- ColorCOLOR ▾
- SizeNormal ▾
- Maximum frame rate30 ▾
- Video quality control :
 - ☐ Fix bit rate384 Kbps ▾
 - ☒ Fix qualityGood ▾
- ☐ Flip☐ Mirror

Image Settings

Save

Motion detection

"Enable motion detection", check this option to turn on the motion detection.

New, click on this button to add a new window. At most three windows can exist at the same time. Use the mouse to drag the window frame to resize or the title bar to move. Clicking on the 'x' at the upper right corner of the window can delete the window. Remember to save to validate the changes.

Save, click on this button to save the related settings regarding to the window. A graphic bar will rise or fall depending on the image variation. A green bar means the image variation is under monitoring level and a red bar means the image variation is over monitoring level. When the bar goes red, the detected window will also be outlined in red. While back to the homepage, the monitored window will hide but the red frame will show when motion is detected.

"Window Name", the text will show at the top of the window.

"Sensitivity", it sets the endurable difference between two sequential images.

"Percentage", it decides the space ratio of motioned objects over the monitored window. Higher sensitivity and small percentage will make motion easier detected.

The following figure shows the screen when **Save** is clicked. The monitoring window has been outlined in red and the graphic bar goes red since the goldfish is moving.



Application setup

Weekly schedule

"Sun" ~ "Sat", select the weekdays that should perform the following operations.

"Snapshots begin at", set the time to start operations. Setting begin time as same as stop time will perform operations 24 hours.

"Snapshots stop at", set the time to stop operations.

Event operation

"Delay second(s) before detecting next event", set the time delay before restarting to check the trigger condition when the current condition is triggered.

"Take snapshots at second(s) after event", when a snapshot is taken upon the condition is triggered, another snapshot will be taken after the configured seconds.

"Trigger condition", there are four conditions related to the digital input and three windows for motion detection. They can be multiple selected. Select the appropriate digital input condition according to the characteristics of the external device. "high", "low" indicate external voltage input or not for level trigger while "rising", "falling" is for edge trigger. There are three windows shown as the name for motion detection.

"undefined" will show instead of the window title if motion detection is not setup yet. In such case, clicking on the "Motion detection" in the note can direct to the configuration page of motion detection.

"Trigger action", there are four options for two actions regarding to either condition. They can be multiple selected. While choosing trigger output alarm, the digital output will short both pins to connect the circuit of the attached external device; otherwise both pins will be open. While choosing to upload snapshots, the method can be either email or FTP. The snapshot names will be "vpre.jpg", "vtrg.jpg", and "vpos.jpg" respectively for the snapshots before event, right upon event, and after event. The date and time suffix may be added according to the option. Confirm the external mail or FTP server settings in network configuration.

"Reset output", check and save this option to reset the external device at the digital output back to the original state.

Sequential operation

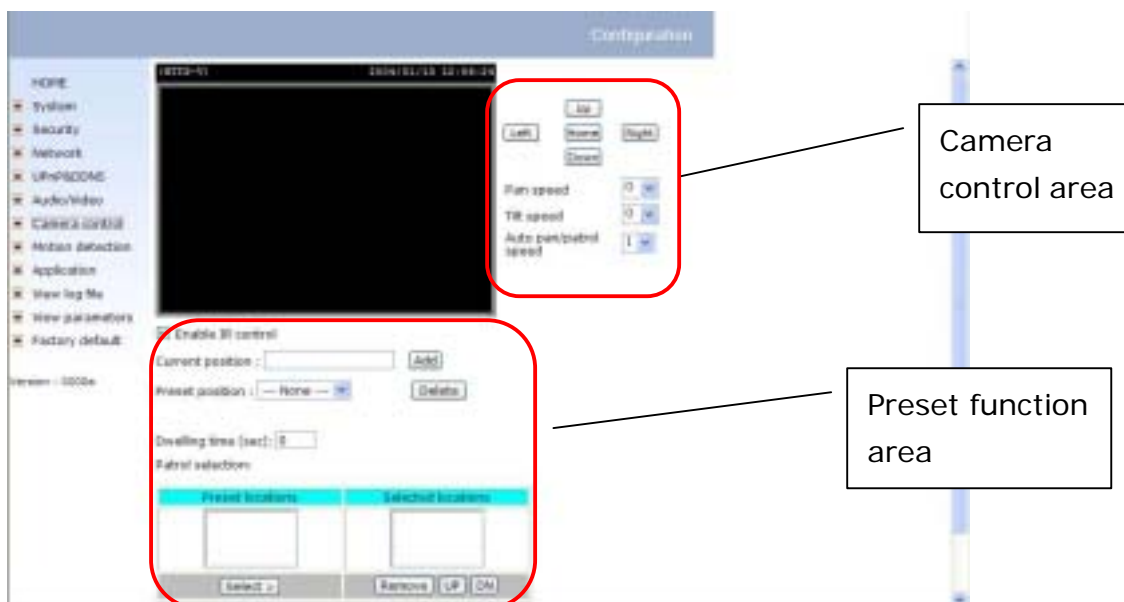
"Snapshot every second(s)", Network Camera will send snapshots at the specified interval to the external server according to the chosen method. Remember this operation is still subject to the weekly schedule.

"Send snapshots by email", any upload action specified in the options above will use the method chosen here. The captured snapshot named "video.jpg" will be attached in the email with subject "Periodic snapshots".

"Send snapshots by FTP", the captured snapshots will upload to the external FTP server with the file name depending on the next option. It can be used to refresh the captured image stored in the external web server to build creative homepages.

"FTP put snapshots with date and time suffix", if the suffix is added, the captured date and time can be easily differentiated from the snapshot file name in either sequential or event operation. For instance, "video@20020102030405.jpg" means the JPEG image was captured at 4 minutes and 5 seconds after 3 o'clock, January 2nd, A.D. 2002. If the suffix is omitted, the file named "video.jpg" on the external FTP server will be refreshed at the specified interval.

Camera Control



At the camera control page, there are two main functions:

A. Camera control:

1. The pan and tilt function can be control through these buttons. The "Left" button can control the camera to view the left area. So are the "Right", "Up" and "Down" buttons. The "Home" button will move the camera to view the center area of the camera.
2. The "pan speed" controls the range of the horizontal movement of the camera. The bigger the value is, the bigger the move angle of clicking on "Left" or "Right" buttons.
3. The "tilt speed" controls the range of the vertical movement of the camera. The bigger the value is, the bigger the move angle of clicking on "Up" or "Down" buttons.
4. The auto pan/patrol speed defines the speed of pan and patrol, the bigger value, the faster the speed.

B. Preset function:

-
1. Enable IR control: The check box will allow administrator to enable IR controller to move the view of the camera. If only controls through URL commands or web pages are allowed, please clear the select box.
 2. Current position: If users want to save the current view as a preset location, input a name for the current video view at "current position", then click "Add" button. The camera provides 20 preset locations.
 3. Preset position: This control will keep a list for preset positions. If "Delete" button is clicked, the current selected position will be remove from the preset list.
 4. Dwelling time: This value specifies the stop time of each preset location or the end position of auto pan function.
 5. Patrol selection: After users save a list of preset positions, the "Preset locations" box will also keep a list of the preset positions, and once the "Select>" button is clicked, the "Selected location" box will keep a list of patrol stops. The "Remove" button can remove the preset position from the patrol stops. And the "UP", "DOWN" buttons can adjust the order of the patrol stops. The preset positions can be added to the patrol stops for several times. The camera provides 20 patrol stops.
- C. The "Save" button
- The button is valid for "Auto pan/patrol speed", "Enable IR control", "Dwelling time" and "Patrol selections". That is: after changing these settings, if "Save" button is not clicked, the setting of the camera will not be changed.

UpnP and DDNS Settings

"Enable DDNS" This option can turn on the DDNS function.

"Provider" The provider list contains four hosts that provide the DDNS services.

Please connect to the service provider's website to make sure the service charges.

"Host name" If users wants to use DDNS service, this field must be filled. Please input the hostname that registered in the DDNS server.

"Username/E-mail" The Username or E-mail field is necessary for login the DDNS server or inform users the new IP address. Please note that when this field is input as

"Username" the following field must be input as **"Password"**.

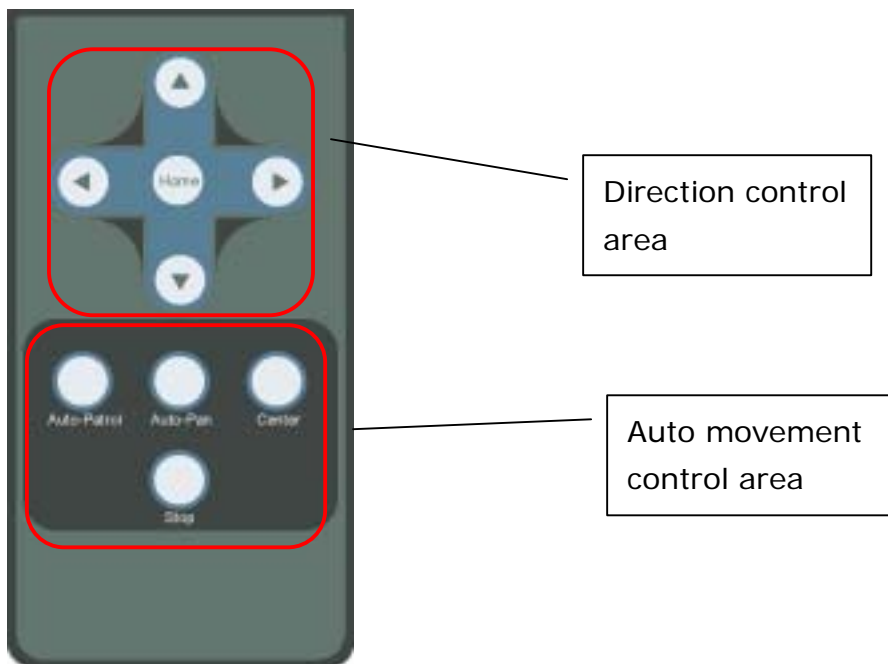
"Password/Key" Please input the password or key to get the DDNS service.

"Enable UPnP" The item can turn on or off the UPnP function. When UPnP is turn off, the camera won't be found through network neighbors in MS Windows.

"Save" Click on the button will save current settings for DDNS service and UPnP function.

Remote controller

PT3112, PT3122 provide a remote controller to command the pan/tilt command of the camera. The direction control part provides the function as the main web page. And the Pan/Patrol/Stop functions are also the same as the main web page.



“Auto Patrol” This button would command the camera to patrol between the preset positions in the patrol list that can be set on the **“Camera control page”**. After one patrol cycle, the camera would stop at the same position as the one before the patrol.

“Auto Pan” This button would command the camera to pan from the current position to the most left or most right, than to the opposite position. After reaching both vertical end position, the camera would stop at the same position as the one before pan.

“Center” This button would calibrate the camera position to the center position as the camera boots up.

“Stop” This button would stop the auto movement of the camera.

Viewing system log

Click the link on the configuration page to view the system log file. The content of the file reveals useful information about configuration and connection after the system boots up.

Viewing system parameters

Click the link on the configuration page to quickly view the whole system parameter set. The content is the same as CONFIG.INI.

Restore factory default settings

Click the link on the configuration page to restore the factory default settings. This means any changes made before will be lost and the system will be reset to the initial status when shipped from the factory. After confirmation, the system will restart and require the installer program to setup the network.

Appendix

A. Troubleshooting

Status LED

After the power has been turned on, Network Camera will perform a self-diagnostic to detect any hardware defects. The following table lists the LED patterns in general conditions. In case of any fatal error, the LED will blink in another pattern.

Condition	LED color
During self-diagnostic after power on	Blink in interchanged green and red
Ethernet signal is lost	Steady red till Ethernet is detected
Before network is setup	Steady green till IP address is confirmed
After network is setup	Blink green every second
Any hardware failure	Other patterns

Reset and restore



There is a button hidden in the pinhole beside the Ethernet socket. It is used to reset the system or restore the factory default settings. Sometimes resetting the system can make the system back to normal state. If the system still has problems after reset, restore the factory settings and install again.

RESET: Poke the wrench to click on the button.

RESTORE: 1. Poke the wrench to press on the button continuously.

2. Wait for self-diagnostic to run twice.

3. Withdraw the wrench as soon as the second self-diagnostic starts.

B. Frequently asked questions

Q What if I forget my password?

A After the administrator's password is assigned, every access to Network Camera needs authentication. If you are one of the managed users, you have to ask the administrator for the password. If you are the administrator, there is no way to recover the root password except for restoring factory default. Refer to Appendix A for the procedures.

Q Why can I not watch video from Network Camera after it is authenticated?

A There are many possible scenarios regarding this problem,

1. If you have just installed Network Camera and are unable to watch the video, check if the heartbeat LED is blinking or the lens cap is removed. If the heartbeat LED is dim, perform the software installation again.
2. If Network Camera is well installed and you are accessing Network Camera for the first time using Internet Explorer, adjust the security level of Internet Explorer to allow installation of plug-ins.
3. If the problem still exists after adjusting, and the message over the image window is showing "connecting", the network traffic may be too crowded.

Q What is the plug-in for?

A The plug-in provided by Network Camera is used to display motion pictures and audio in Internet Explorer. If your system does not allow installation of any plug-in software, the security level of the web browser may need to be lowered. It is recommended that you consult your network supervisors in your office regarding adjustment of the security level. Software installation may be regulated in some offices.

Q Why is the timestamp different from the system time of my PC or notebook?

A The timestamp is based on the system time of Network Camera. It is maintained by a real-time clock inside and can be automatically synchronized with the time server if Network Camera is connected to the Internet and the function is enabled. Differences of several hours may result from the time zone setting.

Q Can I install it on ceiling?

A Yes. There are flip and mirror options in video configuration page to correct the images for upside down installation.

Q The image is not clear enough.

A Rotate the lens to adjust the focus after Network Camera is installed in the proper position. The image settings and white balance can be fine tuned to achieve the best visual effect. Also notice the power line frequency must match the local utility to synchronize the florescent lights to eliminate the uncomfortable flashing.

Q Why does the image not refresh regularly?

A Some anti-virus programs will provide functions to filter the received web content. It will take time to perform the data examination and affect the streaming application such as Network Camera. However it only affects the HTTP mode of Network Camera. If the network allows the HTTP mode only, disable the web filtering function of the anti-virus program temporarily. During the period, users should take the risk of malicious network activity.

Q I have opened motion detection windows but it cannot work.

A If the motion detection windows are setup and names are given, check if the function is checked at the first line. While it is enabled, adjust the sensitivity and percentage to monitor the level indicator if the threshold is appropriate.

Q I cannot hear any sound while watching.

A If there is "V_ONLY" shown above the image, click on connection type to uncheck "Disable audio". If there is "V" shown instead of "AV", the sound card in your PC may not properly installed. If "AV" is shown, check the audio source of Network Camera.

Q How many users are allowed to watch Network Camera at the same time?

A Too many users requesting the real-time multimedia content will digest the network. To achieve the best effect, Network Camera is designed to accommodate maximum ten users to watch and listen to Network Camera at the same time. It is recommended to

build another web server to host a large quantity of users by retrieving contents from Network Camera periodically.

Q How fast is the video rate of Network Camera?

A The MPEG4 codec engine can process 30 frames per second internally. However the total performance is subject to many coefficients as follows:

1. Network throughput,
2. Bandwidth share,
3. Number of users,
4. The complicated objects and movement in view,
5. The level of your PC or notebook which is responsible for displaying images.

In general, the transfer rate in a general local network environment can achieve over 200 kilobytes per second and approximately 10 to 20 pictures of a normal environment per second.

Q How can I keep Network Camera as private as possible?

A Network Camera is designed for surveillance purposes and has many flexible interfaces. The user authentication and special confirmation in installation can keep Network Camera from unauthorized access. You may also change the HTTP port to non-public number. The demo account is good to separate guests from normal users and thus you can easily block guests anytime. You can check the system log to examine any abnormal activities and trace the origins.

Q Why can I not access Network Camera when I setup some options in the application?

A Since Network Camera is a "network camera", any incorrect network settings will make it unreachable. Once the system is missed due to wrong configuration, restore the factory default settings following procedures in Appendix A.

C. URL commands of Network Camera

For some customers who already have their own web site or web control application, Network Camera can be easily integrated through convenient URLs. This section lists the commands in URL format corresponding to the basic functions of Network Camera.

Capture update Snapshot of JPEG image

/cgi-bin/video.jpg

Network Camera will return the most up-to-date snapshot in JPEG format.

Query status of the digital input

/cgi-bin/getdi.cgi

Network Camera will return the status of digital input.

Drive the digital output

/cgi-bin/setdo.cgi?do=<state>

, where state is H, L. H means NC connected with COMMON and L means NO connected with COMMON.

For instance, typing <http://192.168.0.201/cgi-bin/setdo.cgi?do=h> in address bar of the web browser will command Network Camera, with IP address of 192.168.0.201, set digital output to connect to NC with COMMON.

Restore factory default settings

/setup/restore.cgi

Network Camera will automatically restart after restoring factory default

configurations.

Restart system

/setup/reset.cgi

Restart Network Camera without warning.

Page URL

The configuration page has a frame layout including an option list frame and an option page frame. Referenced URLs, except for the configuration page, direct users to the option page frame only. Some pages, like image quality setting and preset setting, are opened in new windows for preview.

These URLs can be accessed only by administrators.

Homepage name	Referenced URL
connection type page	/client.html
configuration page	/setup/config.html
system option	/setup/system.html
security option	/setup/security.html
network option	/setup/network.html
video option	/setup/video.html
motion detection	/setup/motion.html
image quality option	/setup/image.html
application option	/setup/app.html
homepage layout option	/setup/layout.html
system log	/setup/logfile.html
system parameters	/setup/parafire.html
set factory default	/setup/factory.html

System resource URL

There are some images used on the homepage when the homepage layout is in image mode. Administrators may use the following links to show the images saved in Network Camera on another page.

Resource name	Referenced URL
system logo image	/pic/logo.gif
background image	/pic/wallppr.jpg

General format of command URL

Every configuration can be set through URL with POST method by administrators only.

<general format>

URL[?[name=value][&name=value].....]

<method>

POST

<authorized user>

root

System configuration URL

URL: /setup/system.cgi

NAME	VALUE	DESCRIPTION
host	<text string shorter than 15 characters>	system name
Ledoff	yes	turn off front LED
	no	turn off front LED
method	keep	keep date and time unchanged
	auto	use NTP server to synchronize
	manu	directly adjust date and time
date	<yyyy/mm/dd>	year, month and date separated by slash
time	<hh:mm:ss>	hour, minute and second separated by colon
ntp	<domain name or IP address>	NTP server
zone	-12 ~ 12	time zone, 8 means GMT +8:00

Security configuration URL

URL: /setup/security.cgi

NAME	VALUE	DESCRIPTION
rootpass	<text string shorter than 15 characters>	change root password
username	<text string shorter than 15 characters>	add new user
userpass	<text string shorter than 15 characters>	new user's password
deluser	<text string shorter than 15 characters>	existing user name
action	<blank>	validate demo users with "open"
open	yes	grant for demo account
	no	prohibit for demo account
dido	yes	permission for DIDO access
	no	prohibit for DIDO access

Network configuration URL

URL: /setup/network.cgi

NAME	VALUE	DESCRIPTION
reset	yes	enable installation at next boot
	no	disable installation at next boot
ip	<IP address>	Network Camera's IP address
subnet	<IP address>	subnet mask
router	<IP address>	default gateway
domain	<text string shorter than 40 characters>	domain name of Network Camera

dns1	<IP address>	primary DNS server
dns2	<IP address>	secondary DNS server
smtp1	<domain name or IP address>	primary SMTP server
mailto1	<string shorter than 80 characters>	mail recipient address
smtp2	<domain name or IP address>	secondary SMTP server
mailto2	<text string shorter than 80 characters>	mail recipient address
returnemail	<text string shorter than 80 characters>	return email address
ftpp	<number less than 65535>	FTP port
ftp1	<domain name or IP address>	primary FTP server
ftppuser1	<text string shorter than 15 characters>	user name for primary FTP server
ftppass1	<text string shorter than 15 characters>	password for primary FTP server
ftppfolder1	<text string shorter than 40 characters>	upload folder in primary FTP server
ftp2	<domain name or IP address>	secondary FTP server
ftppuser2	<text string shorter than 15 characters>	user name for secondary FTP server
ftppass2	<text string shorter than 15 characters>	password for secondary FTP server
ftppfolder2	<text string shorter than 40 characters>	upload folder in secondary FTP server
http	<number less than 65535>	HTTP port
controlport	<number less than 65535>	control Channel port
videoport	<number less than 65535>	video Channel port
audioport	<number less than 65535>	audio Channel port
lowband	yes	optimal for the low bandwidth
	no	keep the original way

Video configuration URL

URL: /setup/video.cgi

NAME	VALUE	DESCRIPTION
text	<text string shorter than 15 characters>	enclosed caption
size	1	half
	2	half x 2
	3	normal
color	B/W	monochrome
	<other than B/W>	color
quality	fixb	fix bit rate
	<other than fixb>	fix quantization
quan	1	lowest quality of video
	2	lower quality of video
	3	normal quality of video
	4	higher quality of video
	5	highest quality of video
bitrate	64000	set bit rate to 64K bps
	128000	set bit rate to 128K bps
	256000	set bit rate to 256K bps
	384000	set bit rate to 384K bps
	512000	set bit rate to 512K bps
	768000	set bit rate to 768K bps
	1000000	set bit rate to 1000K bps
	1200000	set bit rate to 1200K bps
frame	1	set maximum frame rate to 1 fps
	2	set maximum frame rate to 2 fps
	3	set maximum frame rate to 3 fps
	5	set maximum frame rate to 5 fps
	10	set maximum frame rate to 10 fps

	15	set maximum frame rate to 15 fps
	20	set maximum frame rate to 20 fps
	25	set maximum frame rate to 25 fps
	30	set maximum frame rate to 30 fps
mode	50Hz	synchronize with 50Hz utility
	60Hz	synchronize with 60Hz utility
wb	1	auto white balance
	2	fixed indoor(2800K)
	3	fixed fluorescent 1(3600K)
	4	fixed fluorescent 2(4000K)
	5	fixed outdoor(6000K)
flip	yes	flip image
	no	normal image
mirror	yes	mirror image
	no	normal image

Image quality configuration URL

URL: /setup/image.cgi

NAME	VALUE	DESCRIPTION
brightness	<-5 ~ 5>	adjust brightness of image
contrast	<-5 ~ 5>	adjust contrast of image
hue	<-5 ~ 5>	adjust hue of image
saturation	<-5 ~ 5>	adjust saturation of image
preview	<not required>	not save the parameters
restore	<not required>	recall the original settings
save	<not required>	save the parameters

Application configuration URL

URL: /setup/app.cgi

NAME	VALUE	DESCRIPTION
emode	<not required>	event mode application
smode	<not required>	sequential mode application
smethod	mail	upload snapshots by email
	ftp	upload snapshots by FTP
suffix	<not required>	FTP file with date and time suffix
delay	<integer>	seconds delay to detect next event
inter	<integer>	seconds delay to capture post-event
dihigh	< not required >	set DI high as trigger condition
dilow	< not required >	set DI low as trigger condition
dirise	< not required >	set DI rising as trigger condition
difall	< not required >	set DI falling as trigger condition
motion1	< not required >	set motion window1 as trigger condition
motion2	< not required >	set motion window2 as trigger condition

motion3	< not required >	set motion window3 as trigger condition
ioalarm	< not required >	trigger DO when DI condition matched
mdalarm	< not required >	trigger DO when motion detected
ioupload	< not required >	upload snapshot when DI condition matched
mdupload	< not required >	upload snapshot when motion detected
sinter	<integer>	seconds interval for sequential mode
sbegin	<hh:mm:ss>	time to start sequential mode
send	<hh:mm:ss>	time to stop sequential mode

Homepage layout configuration URL

URL: /setup/layout.cgi

NAME	VALUE	DESCRIPTION
cuslogo	blank	hide logo
	def	use default logo
	url	use image from URL
logourl	<text string shorter than 80 characters>	URL of image for logo
linkurl	<text string shorter than 80 characters>	URL to link when clicking on logo
cusback	blank	hide background image
	def	use default background
	url	use image from URL
backurl	<text string shorter than 80 characters>	URL of image for background
fcolor	<0 ~ 15>	color index for font
bcolor	<0 ~ 15>	color index for background

D. Technical specifications

- System

CPU: Trimedia PNX1300
RAM: 16MB SDRAM
ROM: 2MB FLASH ROM

- Networking

Protocol

TCP/IP, HTTP, SMTP, FTP, Telnet, NTP, DNS and DHCP

Physical

10BaseT Ethernet or 100BaseT Fast Ethernet

- Video

Algorithm supported

MPEG4(short header mode)

Features

Adjustable image size, quality and bit rate
Timestamp and text overlay
3 motion detection windows

Resolution

Up to 30/25 frames at 176x120 or 176x144
Up to 30/25 frames at 352x240 or 352x288

- Camera Specification

1/4 inch color CCD sensor

704x480 or 704x576

2.5Lux / F1.4

AGC, AWB

Electronic shutter: 1/60 – 1/15,000 sec

- Lens

Standard CS mount type lens, 6.0mm, F1.8

- Audio

24Kbps, 8Kbps(optional)

- Microphone

Omni-directional

Frequency: 50 – 16000Hz

S/N ratio: more than 60dB

- General I/O

1 sensor input(max. 12VDC 50mA)

1 relay output(max. 24VDC 1A, 125VAC 0.5A)

- LED indicator

Dual color status indicator

- Dimension

138mm(L) * 88.9mm(W) * 57.2mm(H)

- Weight

NET. 222g

- Power

Consumption: near 4.4W

Universal switching power supply included

Input: 100-240VAC, 50/60Hz, 0.4A

Output: 12VDC, 1.5A

- Operating Environment

Temperature: 0-40°C/32-104°F

Humidity: 95%RH

- EMI & Safety

CE, FCC, BSMI

- Viewing system requirement

Operating system

Microsoft Windows

Browser




Internet Explorer 5.x or above

Electromagnetic Compatibility (EMC)

USA - This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a partial installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded interface cables must be used in order to comply with emission limits.

Europe  - This digital equipment fulfills the requirement for radiated emission according to limit B of EN55022/1998, and the requirement for immunity according to EN50082-1/1992.

Liability

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Rev. 2.11

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